REMARKS

Claims 12-19, 59-63, 65-72, and 74-92 are pending in the present application. Claims 12-19, 59-63, 65-72, and 74-92 have been rejected under § 112 as failing to comply with the enablement requirement. Claims 76, 86, and 91-92 have been rejected under § 112 as being indefinite.

In this Amendment, Applicant has cancelled independent claims 12, 59, 66, and 77 from further consideration in this application to facilitate expeditious prosecution of new claims believed to be allowable. Applicant is not conceding that canceled claims 12, 59, 66, and 77 are not patentable. Applicant respectfully reserves the right to pursue claims, including the subject matter recited in claims 12, 59, 66, and 77, in one or more continuing applications. Also, none of the amendments to the claims were made in response to a prior art rejection.

Dependent claims 76, 86, and 91-92 have been rejected under § 112 as being indefinite for using improper Markush terminology. Claims 76 and 86 have been amended as suggested by the examiner. Claim 91 has been canceled, making the rejection of claim 91 moot. Applicant notes that claim 92 depends from independent claim 59, not dependent claim 91. Applicant asserts that claim 92 is not indefinite, as claim 92 does not include any of the recitations listed in the Office Action.

New independent claim 93 recites a method of capturing gas phase pollutants in a combustion system comprising the steps of "modeling flow patterns of the combustion system," "modeling temperature patterns of the combustion system," "modeling condensation reactions of the combustion system," "using the modeled flow patterns, modeled temperatures patterns, and modeled condensation reactions to predict the impact on gas phase pollutants from injecting particles into the combustion system, and to predict the impact on gas phase pollutants by the

particle size distribution and the amount of injected particles in order to reduce the pollutants to a desired level," "using the modeled flow patterns, modeled temperatures patterns, and modeled condensation reactions to determine one or more optimal locations in the combustion system for the injection of particles," "using the modeled flow patterns, modeled temperatures patterns, and modeled condensation reactions to determine an optimal size and amount of particles to be injected," and "injecting the determined amount and size of particles into the combustion system at one or more of the determined locations to capture gas phase pollutants in the combustion system."

Applicant asserts that new independent claim 93 complies with the enablement requirement. While new claim 93 has not been rejected, Applicant will address the issues raised by the Office Action with respect to the previously pending claims.

As was recited in a previous response, a brief description of the apparatus and method described in the specification follows, to help with the understanding of the arguments below. The description relates to the field of combustion systems, including techniques for capturing gas phase pollutants, such as sulfur trioxide. (Spec., p. 2, para. 2). A typical combustion system includes a furnace or combustion chamber for burning fuel and an air preheater for heating an air stream before being injected into the furnace. (Spec., p.p. 2-3, para. 3). Fuel impurities include S, N, Hg, Na, Al, Si, P, K, Ca, Ti, Fe, V, Ni, As, Cl, and others. Combustion systems burn the fuel and extract energy, resulting in gas cooling. System design and operating conditions impact the form and fate of impurities. The present invention provides methods and systems for improving the capture of impurities (pollutants).

The description describes the modeling of various parameters in a combustion system. While any desired type of computer models may be used with the present invention, the

Specification describes examples. Other computer models may also be used within the spirit and scope of the invention. In the Office Action, the examiner admits that the specification discloses how various programs can be used to model various parameters. (Office Action, page 3, para. 1).

The Specification also describes how modeling these various parameters can be used to predict various aspects of the operation of a combustion system. (For example, see Spec., p. 10-11, para. 22, 24). The modeled parameters can be used to determine optimal locations in a combustion system for the injection of particles. For example, the Specification describes one example of a desired injection location as a location where the particles will capture the pollutants in the most efficient manner, for example, at locations where the temperature patterns are such that pollutant condensation starts to occur. (For example, see Spec., p. 8, para. 19). These determinations are accomplished using the modeled parameters. In another example, the Specification describes determining particle injection locations using a temperature profile generated from a model to reveal locations where pollutant condensation starts to occur, then recites that an optimal location can be a location such that pollution condensation occurs primarily on the injected particles. (For example, see Spec., p. 18-19, para. 39). In another example, the Specification describes determining optimum particle concentration, size, and amount, using modeled parameters to determine when pollutant concentration is reduced to an acceptable level. The Specification also recites that, with or without using a model, pollutant removal can be measured experimentally using various locations and/or various particle concentrations, sizes and amounts. When the pollutant level is measured to be an acceptable level, the corresponding injection location and particle concentration, size and amount can be used. (For example, see Spec., p. 18-19, para. 39).

New independent claim 94 recites a method of capturing gas phase pollutants in a combustion system downstream of a combustion zone comprising "predicting the temperature gradient and location in the combustion system where the critical phenomena of condensation of gas phase pollutants occur," and "using the predicted temperature gradient and location to predict the effect of modifications to the combustion system, wherein the size distribution of resultant ash particles in the combustion system has an increased population of fine particles below 5 microns compared to the combustion system without the modifications."

Applicant asserts that new independent claim 94 complies with the enablement requirement. While new claim 94 has not been rejected, Applicant will address the issues raised by the Office Action with respect to the previously pending claims.

As mentioned above, the description describes the modeling of various parameters in a combustion system, and how modeling these various parameters can be used to predict various aspects of the operation of a combustion system. The modeled parameters can be used to predict the temperature gradient and location in a combustion system where the critical phenomena of condensation of gas phase pollutants occurs. The Specification discusses using this information to predict the effect of modifications to the combustion system. Once temperature patterns and their relative locations are predicted, the effect of modifications to the combustion system can be predicted. The Specification also teaches that there is a significant capture of pollutants (e.g., SO_3) in the presence of fine particles less than approximately 5 μm in diameter as the SO_3-containing flue gases pass through an air preheater. (For example, see Spec., p. 10, para. 21, p. 18, para. 38).

New independent claim 95 recites a method of capturing gas phase pollutants in a combustion system comprising the step of "predicting the temperature gradient and location in

the combustion system where the critical phenomena of condensation of gas phase pollutants occur," "using the predicted temperature gradient and location to configure the combustion system, including determining optimal distribution of particles and particle injection locations in the combustion system to enhance the heterogeneous condensation of gas phase pollutants onto the injected particles," and "injecting particles into the combustion system at one or more locations, wherein the size of the particles and the location of the injection are chosen such that pollutant condensation occurs primarily on the injected particles."

Applicant asserts that new independent claim 95 complies with the enablement requirement. While new claim 95 has not been rejected, Applicant will address the issues raised by the Office Action with respect to the previously pending claims.

As mentioned above, the description describes the modeling of various parameters in a combustion system, and how modeling these various parameters can be used to predict various aspects of the operation of a combustion system. The modeled parameters can be used to predict the temperature gradient and location in a combustion system. As discussed above, the Specification discusses determining optimal distribution of particles and particle injection locations in the combustion system to enhance the condensation of gas phase pollutants onto the injected particles.

New independent claim 96 recites a method of capturing gas phase pollutants in a combustion system downstream of a combustion zone comprising the steps of "predicting the temperature gradient and location in the combustion system where the critical phenomena of condensation of the gas phase pollutants occur," "using the predicted temperature gradient and location to determine optimal size distribution of particles and locations to inject particles into the combustion system to enhance heterogeneous condensation of gas phase pollutants onto the

injected particles," and "injecting particles into the combustion system at one or more of the determined locations."

Applicant asserts that new independent claim 96 complies with the enablement requirement. While new claim 96 has not been rejected, Applicant will address the issues raised by the Office Action with respect to the previously pending claims.

As mentioned above, the description describes the modeling of various parameters in a combustion system, and how modeling these various parameters can be used to predict various aspects of the operation of a combustion system. The modeled parameters can be used to predict the temperature gradient and location in a combustion system. As discussed above, the Specification discusses determining optimal distribution of particles and particle injection locations in the combustion system to enhance the condensation of gas phase pollutants onto the injected particles.

It is respectfully submitted that all claims are patentable over the prior art. It is further more respectfully submitted that all other matters have been addressed and remedied and that the application is in form for allowance. Should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Bruce A. Johnson, Applicants' Attorney at 512-301-9900 so that such issues may be resolved as expeditiously as possible. Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 to deposit

account number 50-3864 (Johnson & Associates).

Respectfully Submitted,

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